

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
Mario Scurati et al.

Conf. No. 3225

Application No.: 10/663,286

Art Unit: 1797

Filed: September 16, 2003

Examiner: Nathan A. Bowers

For: INTEGRATED DEVICE FOR BIOLOGICAL  
ANALYSES

**DECLARATION UNDER 37 C.F.R. 1.132**

MS After Final  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

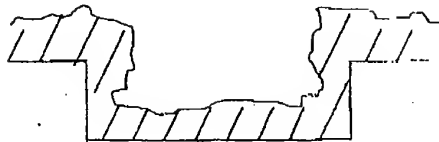
I, FLAVIO FRANCESCO VILVA, declare as follows:

1. I am at least 18 years of age and am competent in all respects to make the following statements.
2. I am a co-inventor for claims 1-54 currently pending in US Patent Application No. 10/663,286.
3. I have read and understand the above-referenced application and pending claims.
4. I am a person skilled in the art of integrated devices for biological analysis. See the attached *curriculum vitae* (Exhibit I).
5. The present invention is directed to INTEGRATED DEVICE FOR BIOLOGICAL ANALYSES.
6. One prior art cited by the Examiner is Levine (US6031286). I have read and understand Levine.

7. In my view, the technique for making buried channels taught in Levine cannot be used to make microfluidic devices for biochemical analyses as disclosed and claimed in the current application.
8. In Levine, the buried channel is formed by filling an open trench with a filler material (ref no. 25 in Levine).
9. Normally, when filling an open trench with a filler, a buried channel is not formed because all surfaces of the trench tend to be coated to the same degree. This is acknowledged by Levine in the specification as well. (Lines 11 to 17, column 3 of Levine.) Hence, a pan shaped product, instead of a buried channel, will normally be formed after filling.
10. In order to form a buried channel, Levine uses a "thick" filler in combination with a "narrow and tall" trench, i.e. one with a large height (H) to width (W) ratio. (Lines 41 to 45, column 3 of Levine, stating that "[b]y forming trenches 10 that have a large aspect ratio (H/W), in combination [of] a CVD or PECVD layer having an appropriate deposition characteristics, a uniform desired hole or micro pipe is formed.")
11. A person with ordinary skills in the art would immediately understand that a "thick" filler would make it possible to accumulate slightly more filler at the top opening of a trench instead of evenly coating the entire trench; a "narrow and tall" would make it possible for the slightly accumulated filler to meet and "close" at the top opening of the trench to form a buried channel. Please see the drawing below for illustration.



12. If, however, the trench is wide and shallow, the filler would not be able to meet at the top and "close" the opening, and hence no buried channel would be formed. Please see the drawing below for illustration.



13. Therefore, a person skilled in the art would understand the factual reasons why the technology of Levine will not work on trenches with low height (H) to width (W) ratio. Based on these facts, Levine also will not be able to produce buried channels with 200  $\mu\text{m}$  in width and 150  $\mu\text{m}$  in depth as described in paragraph [0089] of the current application.
14. Because microfluidic devices for biochemical analyses often require large channels to accommodate biological fluids, a person skilled in the art would not consider Levine as suitable for the current invention.
15. For the same reasons, a person skilled in the art would judge that there is no reasonable expectation of success for applying Levine to the current invention.

I declare that all statements made herein of my own knowledge are true and made on information believed to be true; further that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code; and that such willful false statements may jeopardize the validity of any application for which it is used.

Dated: October 13, 2008

By

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Docket No.: 31175803-004001  
(PATENT)

## EXHIBIT 1

## CURRICULUM VITAE - FLAVIO FRANCESCO VILLA

Flavio Francesco Villa was born in Milan, Italy.

In 1978, he received a degree in Physics (cum laude) from Università degli Studi of Milan.

Since then, he has worked at the Research and Development Center of STMicroelectronics in Cornaredo (Italy). In the past, he has dealt with Bipolar and BCD technologies. He is currently involved in developing integrated devices for molecular diagnostics and low cost processes for production of SOI substrates. Since 1982, he has held lectures and courses at universities, companies and research centers and is involved in training activities of technical staff in ST.

He is the author of scientific articles and named inventor in several patents and patent applications. He is a member of the scientific committee of AISEM (Associazione Italiana Sensori E Microsistemi - Italian Association of Sensors and Microsystems) and of the Electrochemical Society.